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ENVIRONMENT AND SUSTAINABLE DEVELOPMENT: SUSTAINABLE USE AND CONSERVATION OF THE MARINE LIVING RESOURCES OF THE HIGH SEAS

Fisheries by-catch and discards and their impact on the sustainable use of the world's living marine resources

Note by the Secretary-General

1. At its forty-ninth session, the General Assembly, in its resolution 49/118 of 19 December 1994, recognized that in relevant provisions of the United Nations Convention on the Law of the Sea 1/ States are called upon to take into consideration, when establishing conservation and management measures for target fisheries, the effects on associated or dependent species, taking into account the best scientific evidence available. It recalled that the United Nations Conference on Environment and Development (UNCED) and the International Conference on Responsible Fishing had agreed to promote the development and use of selective fishing gears and practices that minimized waste in the catch of target fish species and minimized by-catch of non-target fish and non-fish species. The Assembly also invited relevant subregional and regional fisheries management organizations and arrangements as well as the Food and Agriculture Organization of the United Nations (FAO) to review, within their respective competencies, the impact of fisheries by-catch and discards on the sustainable use of living marine resources. FAO was also invited to formulate fisheries by-catch and discard provisions in its Code of Conduct for Responsible Fishing, taking into account work being done elsewhere.

2. In response to that resolution, FAO has submitted for the attention of the General Assembly the report which is annexed to the present note.

Notes

1/ Official Records of the Third United Nations Conference on the Law of the Sea, vol. XVII (United Nations publication, Sales No. E.84.V.3), document A/CONF.62/122.

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ANNEX

Report of the Food and Agriculture Organization of the United Nations on fisheries by-catch and discards and their impact on the sustainable use of the world's living marine resources

I. ASSESSMENT OF FISHERIES BY-CATCH AND DISCARDS

1. FAO promotes national and international action for the rational management and development of world fisheries. It does this not only through the regular programme of activities at its headquarters, but also through the field and regional offices and regular consultation with regional (FAO and non-FAO) fishery bodies, the fishing industry and other institutions. a/

2. The definition of "by-catch" is all "species captured other than target species". b/ "Discards" may constitute a small-to-significant fraction of the identified by-catch, depending on the nature of the fisheries and local customs.

3. Since the creation of FAO in 1945, the fishery scientists working outside and within the framework of FAO fishery activities have been aware, in the context of fishery management, of the importance of gear selectivity in minimizing the by-catch of undersized fish of target species, non-target fish species and non-fish species. Indeed several FAO regional bodies have introduced regulatory measures for gear, c/ including the regulations concerning the use of minimum mesh size in gears used for the catch of certain target species.

4. Fishery managers and conservation/environmental groups have been concerned that by-catch, and discards, may be contributing to biological overfishing and altering the structure of marine ecosystems.

5. The recent global assessment of fisheries by-catch and discards estimated an annual discard range of between 17.9 and 39.5 million tonnes, with a mean estimate of 27 million tonnes. No estimate could however be given of the mortality level of "escapees" from fishing gear during operations. Although many of the discards include non-target or low-value species, undersized fish of target species are also discarded. The combined effect of this practice may threaten the maintenance of biodiversity and the long-term sustainability of fisheries.

6. The discard range may be an underestimate in that recreational fishery discards are not included; the database for some areas of the world is incomplete, and discard rates are not included for marine mammals, seabirds, turtles and, for many areas, invertebrates.

7. Although discards in tropical industrial shrimp-trawl fisheries are generally high, in many of the world's artisanal fisheries a variable share of the shrimp by-catch may be species retained for human consumption or for other purposes. Further, discard rates and numbers may misrepresent the impacts because for a number of species some fraction of the discard survives. Without good estimates of the biomass discarded, the survival rate, other fish-related

losses and the landed catch of a particular species, it will be impossible to assess overall impacts of fishing.

8. In general, since the 1992 United Nations Conference on Environment and Development (UNCED), fisheries conservation and management practice has emphasized an ecosystem approach, taking full account, inter alia, of the need to exploit fisheries in a precautionary manner. The ecosystem approach differs significantly from past approaches to fisheries conservation and management, whereby the primary concern was the impact of fishing on the target species, with lesser concern for impacts on non-target fish and animal populations.

9. The ecosystem approach to fisheries management necessitates further significant extension of fisheries research beyond an emphasis on target-species and single-species approaches to stock assessment and to the determination of optimal exploitation. A new research emphasis and a significant additional capacity, including that for the development of new methods, are required to make such research effective so as to lead to meaningful advice on fisheries management in the ecosystem context. Additional research and data collection are particularly needed to assess the biological impact of by-catch. The status of the stocks of non-target species and their biologically allowable mortality are now frequently not determined, regardless of being necessary information for rational fisheries management.

10. Some of the impacts of discarding may include: (a) foregone catch as a result of mortalities imposed on recruits to the target fishery; (b) foregone catch resulting from mortalities imposed on target fisheries by fisheries targeting other species; (c) reduction of fishing time resulting from by-catch quotas; (d) costs of purchasing gear adapted to comply with discarding measures; (e) loss of catch and time when a gear type is outlawed and no efficient alternative gear type is available or can be deployed owing to vessel or other restrictions; and (f) loss of catch owing to capture of immature fish being subtracted from the total allowable catch (TAC). There may well be an impact of an economic nature owing to the introduction of required observer programmes and sorting costs. Much more work is needed to assess adequately the true economic cost of discards on fishers and the benefits and costs of potential solutions to society as a whole. In some cases, mortalities associated with discards may decrease key predator or competitor populations and enhance system productivity. Furthermore discarding practices may permit fisheries to remain cost-effective.

11. There is a growing global recognition that the world's fishing effort already exceeds what is necessary to harvest sustainable yields of marine fish. d/ The single action that will provide the greatest improvements to the by-catch and discard problem in certain fisheries will be the reduction of these effort levels. Without such control, other solutions to the by-catch and discard problem will be less effective and real success in efforts to better manage the ocean's resources will be more difficult to attain.

12. In the Rome Consensus on World Fisheries, adopted by the Ministerial Meeting on Fisheries, held in Rome on 14 and 15 March 1995, it is stated that improved fisheries conservation and management, along with better protection from harmful sea- and land-based activities, are crucial to maintaining world fish resources and aquatic ecosystems. The Ministerial Meeting urged that

Governments and international organizations take prompt action, inter alia, to adopt policies, apply measures and develop techniques to reduce by-catches, fish discards and post-harvest losses.

13. On a number of occasions FAO and other agencies have organized activities to address the question of the utilization of by-catch so as to contribute towards food security. This was addressed at a consultation organized in 1981, e/ and has been addressed at a Technical Cooperation among Developing Countries (TCDC) workshop on the utilization of by-catch from shrimp trawlers, organized by the Government of Madagascar, the Special Unit for Technical Cooperation among Developing Countries of the United Nations Development Programme (UNDP) and FAO, at Nosy Bé, Madagascar, from 6 to 8 June 1995. Although shrimp fisheries account for the largest share of discards in global fisheries, it should also be noted that much of the shrimp produced in tropical waters is harvested by artisanal traps, and other species caught along with shrimp are rarely discarded, but rather consumed in the fishing villages. f/

II. UNITED NATIONS CONFERENCE ON STRADDLING FISH STOCKS AND HIGHLY MIGRATORY FISH STOCKS

14. Data and related information concerning high seas fisheries are poor and incomplete, and as a result conservation and management of high seas resources is weak. Consistent with the 1982 United Nations Convention on the Law of the Sea, the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks, convened in 1993 as a consequence of the 1992 United Nations Conference on Environment and Development, seeks to improve and strengthen the conservation and management of these two types of stocks and to ensure that, as a foundation for conservation and management, data and the timeliness for the provision of data are greatly enhanced.

15. The revised Draft Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks g/ (the Draft Agreement), prepared by the Chairman of the Conference, takes a strong ecosystem approach to high seas fisheries conservation and management and requires that high seas fishing activity be assessed in terms of the "impacts of fishing, other human activities and environmental factors on target species and species belonging to the same ecosystem or dependent upon or associated with the target species" (art. 5 (d)), to "adopt, where necessary, conservation and management measures for species belonging to the same ecosystem or dependent on or associated with the target species, with a view to maintaining or restoring populations of such species above levels at which their reproduction may become seriously threatened" (art. 5 (e)) and to "promote the development and require the use of selective, environmentally safe and cost-effective fishing gear and techniques in order to minimize pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species (both fish and non-fish species) (hereinafter referred to as non-target species) and impacts on associated or dependent species, in particular endangered species" (art. 5 (f)). As part of this ecosystem approach to fisheries conservation and management high seas fishers are obligated to report comprehensively, through appropriate subregional or regional fisheries

management organizations or arrangements, on all target and non-target (by-catch) species taken in the course of fishing operations. Comprehensive data must be provided on target and non-target species caught and retained, as well as other species that are discarded. h/ The requirements and standards to be established for high seas catch reporting represent a significant departure from conventional fisheries catch/effort reporting whereby retained target species data are normally the only data reported.

16. If fully implemented through effective flag State control, the Draft Agreement i/ will facilitate the collection and reporting of reliable catch and related data not only for target species, but also for by-catch and discarded fish and animal species. The availability of these data will enable assessments to be made to more accurately determine the effects of fishing both on target species and more broadly on the ecosystem as a whole. However, to obtain a complete and comprehensive evaluation of the impact of fishing on the ecosystem, similar requirements for fisheries falling under zones of national jurisdiction will also be required.

III. DRAFT CODE OF CONDUCT FOR RESPONSIBLE FISHERIES

17. According to instructions of FAO governing bodies, the draft Code of Conduct for Responsible Fisheries j/ has been formulated to be consistent with the 1982 United Nations Convention on the Law of the Sea, taking into account the 1992 Declaration of Cancún, the 1992 Rio Declaration and the provisions of Agenda 21 of UNCED, the Strategy endorsed by the 1984 FAO World Conference on Fisheries Management and Development and other relevant instruments. It will also take into account the outcome of the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks.

18. Certain articles of the draft Code of Conduct address matters of concern, pertaining to by-catch and discards, in follow-up to General Assembly resolution 49/118 of 19 December 1994. It should be emphasized that the draft Code is currently open for revision.

19. Article 6.2.2 of the draft Code of Conduct is concerned with objectives within the overall issue of fisheries management, and the relevant text (subject to revision) notes that "States and fisheries management organizations or arrangements should ensure that long-term management objectives are set to provide a high probability that, inter alia, waste, by-catch and discards in fisheries are progressively reduced and avoided as far as practical."

20. Another subsection which may be amended in the final wording pending progress at the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks is article 6.6.10, which states:

> "In order to protect juveniles or spawners, avoid waste and reduce the catch which is not sought or retained by the fishers, fisheries management authorities should implement technical measures such as minimum landing size limits, mesh or gear regulations, closed areas, including marine reserves, or closed seasons where necessary. Regulations governing multi-species fisheries should be designed to ensure minimum discarding."

21. Article 7.4.5 is concerned with fishing practices within the overall issue of fishing operations, and the relevant text notes that "States, with relevant groups from industry, should encourage the development and implementation of technologies and operational methods that reduce discards. At the same time they should discourage, as appropriate, the use of fishing gear and practices that lead to the discarding of catch and should promote the use of fishing gears and practices that increase survival rates of escaping fish."

22. Article 7.5.1 is concerned with fishing gear selectivity, also within the overall issue of fishing operations, and the text notes that "States should require that fishing gear, methods and practices are sufficiently selective so as to minimize the catch of non-target species, waste, discards and threats to endangered species, and that the intent of related regulations is not circumvented by technical devices. In this regard, fishers should cooperate in the development of selective gears and methods. States should ensure that information on new developments and requirements is made available to all fishers."

23. With regard to protection of the marine environment, article 7.7.1 reads: "States should introduce and enforce laws or regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as amended by the Protocol of 1978 (MARPOL 73/78)."

24. Article 10.1.8 of the draft Code of Conduct is concerned with responsible fish utilization within the overall context of post-harvest practices and trade, and the text notes that "States should encourage those involved in fish processing, distribution and marketing to reduce post-harvest losses and waste, and improve the utilization of by-catch to the extent that it is consistent with responsible fisheries management practices."

25. Article 11.10 is concerned with fisheries research, and states that "States should carry out studies on the selectivity of fishing gears to target species and on the behaviour of target and the non-target species to the fishing gear with a view to minimizing non-utilized catches and safeguarding the biodiversity of ecosystems as an aid for management decisions."

IV. CONCLUSION

26. A major strategy to reduce the level of by-catch would be improvement in the selectivity of fishing gear and fishing methods. While there has been an increase in activity to develop selective gears and techniques, much of the research has been carried out in the higher latitudes and is not readily transferable to multi-species tropical fisheries, where the tropical shrimp trawls still produce high rates of by-catch.

27. The strategy to reduce the negative impact of by-catch would include: (a) a specific emphasis on reducing by-catch of stocks reduced below their optimum levels, (b) a better disposal of by-catch or utilization of by-catch for human consumption, and other purposes benefiting people, especially if the stocks remain above optimal levels. This strategy necessitates the determination of the status of stocks, individuals of which constitute the

by-catch, and the biologically allowable mortality for these stocks, requiring an additional research capacity for these tasks; certainly, until this is carried out, a precautionary approach to fisheries management may need to be applied.

28. FAO estimates that a significant reduction in discards by the year 2000 of around 60 per cent could be achieved by: (a) a concentrated effort to improve the selectivity of fishing gear; (b) the development of international standards for research, and an additional research designed specifically to address problems resulting from by-catch; (c) greater interaction between research staff, industry and fisheries managers; and (d) the application of appropriate technology through fisheries regulations. To achieve this goal, FAO and national research institutes will need to strengthen and widen the scope of current programmes on gear selectivity. k/

29. As a consequence of a decision of the FAO Council (108th session, 5-14 June 1995), an open-ended Technical Committee has been set up to review and agree on the form and content of the Code of Conduct for Responsible Fisheries and any follow-up action, including further provisions with regard to by-catch and discards if necessary, which may be required to finalize the Code prior to its submission to the Twenty-eighth Session of the FAO Conference (Rome, 20 October-2 November 1995) for approval and adoption. Since the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks should conclude its work in August 1995, the relevant part of the draft text could then be reconciled with the language agreed upon at the Conference.

Notes

a/ FAO has consulted with its own regional fishery bodies (the General Fisheries Council for the Mediterranean, the Fishery Committee for the Eastern Central Atlantic, the Indian Ocean Fisheries Commission, the Asia-Pacific Fisheries Commission and the Western Central Atlantic Fisheries Commission) in compiling the present report.

b/ D. L. Alversen, M. H. Freeberg, J. G. Pope and S. A. Murawski, "A global assessment of fisheries by-catch and discards", FAO Fisheries Technical Paper No. 339 (Rome, 1994).

c/ Mesh size and other regulatory measures to reduce by-catch have been examined by FAO and its regional bodies over many years. For example, the FAO Fishery Committee for the Eastern Central Atlantic (CECAF) at its third session in 1972 recommended the introduction of a provisional minimum mesh size of 70mm for use by vessels fishing for hake or sea bream in the CECAF area.

d/ Summarized in the FAO report entitled "The state of world fisheries and aquaculture" (Rome, 1995), prepared for and discussed at the FAO Twenty-first Session of the Committee on Fisheries (COFI) held in Rome from 10 to 15 March 1995, as well as the FAO Ministerial Meeting on Fisheries held in Rome on 14 and 15 March 1995.

e/ "Fish by-catch, bonus from the sea", Report of a Technical Consultation on Shrimp By-catch Utilization, Georgetown, Guyana, 27-30 October 1981 (Ottawa, Canada, International Development Research Centre).

f/ F. Teutscher, "By-catch in tropical shrimp fisheries", prepared for the TCDC workshop on the utilization of by-catch from shrimp trawlers, Nosy Bé, Madagascar, 6-8 June 1995.

g/ A/CONF.164/22/Rev.1.

h/ See A/CONF.164/22/Rev.1, annex 1, "Standard requirements for collection and sharing of data".

i/ The Conference subsequently adopted, on 4 August 1995, the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (A/CONF.164/37). The Agreement incorporated the draft provisions quoted here with no substantive changes.

j/ FAO document CL 108/20, prepared for the 108th Session of the Council of FAO, Rome, 5-14 June 1995.

k/ See "The state of world fisheries and aquaculture", op. cit., p. 21.